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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,231	03/06/2001	James A. Crawford	69901	3328

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FITCH EVEN TABIN AND FLANNERY
120 SOUTH LA SALLE STREET
SUITE 1600
CHICAGO, IL 60603-3406

EXAMINER

RAMOS FELICIANO, ELISEO

ART UNIT	PAPER NUMBER
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2681

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/800,231

Applicant(s)

CRAWFORD, JAMES A.

Examiner

Eliseo Ramos-Feliciano

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-9, 11-21, 24, 25, 27-37 and 40-43 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 10, 22, 23, 26, 38 and 39 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-4.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the references in page 1, lines 7-11 and page 7, lines 15-26 to U.S. Patent Applications need to be updated as to indicate correct serial number and current status (pending, patented and Pat. No., abandoned). Correction is required.

Information Disclosure Statement

2. The references listed in the Information Disclosure Statement filed on 9/27/2001, 3/29/2002, and 6/27/2003 have been considered by the examiner (see attached PTO-1449 form).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-4, 7-9, 11-12, 16-21, 24-25, 27-37, 40-41** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pallonen (US Patent Number 6,408,169).

Regarding **claims 1 and 34**, Pallonen discloses a method and apparatus for performing diversity antenna selection. The method and apparatus include (SEE FIGURE 1)

measuring and means for measuring L different antenna branches (1-4), n antenna branches at a time (see abstract, and column 2, lines 59-67);

using and means for using the measurements to identify a group of n of the L different antenna branches that receive best possible signal based on signal quality BER (see abstract, and

column 2, lines 45-58). The signal with the strongest strength RSSI (column 4, lines 42-45; column 6, lines 14-19; column 5, lines 57-61).

Pallonen further includes selecting and means for selecting the identified group of antenna branches (see column 4, line 43).

Even though Pallonen teaches a selection based on BER and RSSI, fails to specifically disclose minimizing an approximate bit error probability.

However, the best possible signal implies minimum BER for optimum communications. And using an approximate bit error probability instead of BER (bit error rate) would be desirable for reducing implementation costs.

Pallonen teaches that the signal is constructed from logical channels that read as the claimed "sub-carriers" in view of that the same Pallonen explains that these logical channels are portions of frequency channels that contain the signal (see column 8, lines 16-19).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ an approximate bit error probability instead of BER for the advantage of reducing implementation costs.

Regarding **claim 2-4, 9, 12 and 35-37**, Pallonen discloses everything claimed as applied above (see claims 1 and 34). In addition, since the measurements include RSSI and the same is a measurement of signal power (power magnitude), the measurements include power measurements as claimed (see abstract). The BER is computed for each sub-carrier for each L antenna branches, n antenna branches at a time (abstract). Different groupings are formed and selected based on the minimum BER (column 4, lines 42-45). As shown in Figure 1, the BER are multiplexed corresponding to n antenna branches.

Regarding **claim 11**, Pallonen discloses everything claimed as applied above (see claim 3). In addition, Pallonen includes storing the computed BER (col. 5, line 55; col. 7, line 3).

Regarding **claims 7-8 and 40-41**, Pallonen discloses everything claimed as applied above (see claims 1 and 34). In addition, as explained above, Pallonen teaches that the path with best possible signal is selected based on BER and RSSI. The signal with the strongest strength RSSI (abstract, column 2, lines 45-58, column 4, lines 42-45; column 6, lines 14-19; column 5, lines 57-61). Such selection between paths is contended to read as the claim calibration. The RSSI implies signal power as claimed as explained above.

Regarding **claims 16-19**, Pallonen discloses everything claimed as applied above (see claim 1). In addition, the output signal is constructed from the sub-carriers that are received by any one of the n antenna branches as claimed. The rest of the limitations have been treated above. Explanation and citations above is incorporated herein.

As to **claims 20-21, 24-25, 27-33**, they are obvious apparatus structure claims of method claims discussed above. Therefore, same rejections explained above are applied. See Figure 1.

5. **Claims 13-15 and 42-43** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pallonen (US Patent Number 6,408,169) in view of the Admitted Prior Art (Figure 4 and page 12 of the present disclosure).

Regarding **claims 13-14 and 42**, Pallonen discloses everything claimed as applied above (see claim 3). However, Pallonen fails to specifically disclose the claimed frame including a diversity selection portion and antenna branch probing portions; nor OFDM as claimed.

The prior art admitted by applicant and exhibited in Figure 4 and page 12 of the present specification (hereinafter simply referred as the Admitted Prior Art) teaches frame structure 300

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for radio frequency (RF) communications that is a standard of communications, and includes a diversity selection portion (part of 306) comprising one or more antenna branch probing portions; see Figure 4 and page 12, lines 1-20 of the present specification. The technology is OFDM as claimed.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Admitted Prior Art' frame as claimed because it is a standard of communications. OFDM technology has the further advantage of increased communication capacity.

Regarding **claims 15 and 43**, Pallonen discloses everything claimed as applied above (see claim 14 and 42). In addition, Pallonen teaches that the measurements are taken with separate RF receivers (9, 10); see Figure 1.

Allowable Subject Matter

Claims 5-6, 10, 22-23, 26, 38-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 5, 22 and 38 would be allowable if rewritten in independent form as explained above because the prior art of record fails to anticipate or render obvious the claimed *summing the minimum ones* limitation, in combination with all other limitations in the claim(s).

Claims 10 and 26 would be allowable if rewritten in independent form as explained above because the prior art of record fails to anticipate or render obvious the claimed *Q-function* limitation, in combination with all other limitations in the claim(s).

Citation of Pertinent Prior Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hochwald et al. (US Patent Number 6,058,105) discloses an antenna diversity communication system;

McNicol et al. (US Patent Number 5,940,454) discloses a diversity control apparatus;

Zhang (US Patent Number 6,369,758) discloses an adaptive antenna array with diversity.

Conclusion

7. Any inquiry concerning this communication from the examiner should be directed to Eliseo Ramos-Feliciano whose telephone number is 703-305-0078. The examiner can normally be reached from 8:00 a.m. to 5:30 p.m. on 5-4/9 1st Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Erika A. Gary, can be reached on (703) 308-0123. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ELISEO RAMOS-FELICIANO
PATENT EXAMINER

ERF/erf
May 28, 2004

JEAN GELIN
PATENT EXAMINER

Jean Heland Gelin